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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/766,918	01/30/2004	Thomas Patrick Nolan	146712003900	3978

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EXAMINER	
BERNATZ, KEVIN M	
ART UNIT	PAPER NUMBER
1773	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/12/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/766,918	NOLAN, THOMAS PATRICK	
	Examiner	Art Unit	
	Kevin M. Bernatz	1773	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9 and 11-22* is/are pending in the application.

4a) Of the above claim(s) *11-20* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-9,21 and 22* is/are rejected.

7)☒ Claim(s) *4* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. *20070202*.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Preliminary amendments to claims 1, 4, 7 and 20, filed on November 30, 2006, have been entered in the above-identified application.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Examiner's Comments

3. The Examiner notes that claim 1 is somewhat unclear because of the wording of the claim. Specifically, the Examiner notes that the matrix disclosed by Applicants is a non-ferromagnetic matrix, which is different than "the matrix comprises a non-ferromagnetic material" (which implies that the matrix can be magnetic, provided at least some portion of it comprises a material which is non-ferromagnetic). The Examiner notes that Applicants' as-filed disclosure only supports the interpretation that the matrix (as a whole) in non-ferromagnetic while the portions (as a whole) are ferromagnetic (*see Figure 4 and Paragraph 0033*). The Examiner suggests re-wording claim 1 as follows: insert "non-ferromagnetic" before "Co-containing" on line 2; insert "comprising a ferromagnetic material" after "ferromagnetic portion" on line 3; delete "the matrix comprises a non-ferromagnetic material, the ferromagnetic portion comprises a ferromagnetic material," on lines 4 – 5. The Examiner notes that these changes are not

required since the claims are read in light of the specification, but the Examiner recommends them for clarity purposes.

Request for Continued Examination

4. A Request for Continued Examination (RCE) under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 30, 2006 has been entered. An action on the RCE follows.

Claim Objections

5. Claim 4 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 102

6. Claims 1, 2 and 21 are rejected under 35 U.S.C. 102(a) and/or (e) as being anticipated by Fullerton et al. (U.S. Patent No. 6,440,589 B1)

Regarding claim 1, Fullerton et al. disclose a magnetic recording medium (*Title and Abstract*) comprising a substrate (*Figure 2, element 11*) and a first magnetic layer (*element 17*), wherein the first magnetic layer comprises (a) a Co-containing continuous

matrix comprising at least one or more components (*col. 2, line 45 bridging col. 3, line 9; col. 3, lines 48 – 58; and col. 5, lines 47 – 64: "CoO"*) and (b) a ferromagnetic portion that is different from the matrix (*col. 2, line 45 bridging col. 3, line 9; col. 3, lines 48 – 58; col. 5, lines 47 – 64; and claims 1 and 4*), the matrix comprises a non-ferromagnetic material (*col. 5, lines 57 – 63*), the ferromagnetic portion comprises a ferromagnetic material (*ibid and claims 1 and 4*), and said ferromagnetic portion comprises more than zero and less than 5 atomic percent Cr (*col. 3, lines 51 – 55 and claims 8, 15 and 17: i.e. concentration of Cr = 1 – 25 or 1 - 35 at% in grains*).

Regarding claim 2, Fullerton et al. disclose a second magnetic layer meeting applicants' claimed structure (*Figure 2, element 15*).

Regarding claim 21, Fullerton disclose ferromagnetic portions that can comprise CoPt (*col. 3, lines 40 – 58*).

Claim Rejections - 35 USC § 103

7. Claims 3 and 6 – 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fullerton et al. as applied above.

Fullerton et al. is relied upon as described above.

Regarding claim 3, Fullerton et al. fail to explicitly disclose using a matrix comprising Co and Cr.

However, the Examiner notes that Fullerton et al. disclose an embodiment utilizing CoCr as the first magnetic layer, wherein Fullerton et al. teaches that the non-ferromagnetic portion is "Cr-rich" regions and the ferromagnetic grains are "Co-rich

islands" (*col. 6, lines 42 – 50*). The Examiner deems that one of ordinary skill in the art would readily appreciate that "Cr-rich" means that there is both Co and Cr in the region, but that it is primarily composed of Cr, while "Co-rich" means that both Co and Cr are contained in the islands, but that it is primarily composed of Co. As such, the Examiner notes that Fullerton et al. implicitly teaches an embodiment comprising Co and Cr in the matrix, as well as Cr in the ferromagnetic grains, where the concentration of Cr in the ferromagnetic grains encompasses applicants' claimed Cr concentration (*e.g. 1 – 25 or 35 at%*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant(s) invention to modify the device of use a structure meeting applicants' claimed limitations as taught by Fullerton et al., since Fullerton et al. disclose that such a structure is a preferred embodiment of the disclosed invention and that the use of a CoCr alloy results in "Co-rich islands" segregated by "Cr-rich" regions.

Regarding claim 6, Fullerton et al. disclose embodiments meeting the claimed relative Ms values (*col. 5, lines 38 – 52 and claim 1*).

Regarding claims 7 and 8, Fullerton et al. disclose the claimed limitations (*col. 6, lines 18 – 38*).

8. Claims 9 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fullerton et al. as applied above in Paragraphs 10 and 11, and further in view of Kikitsu et al. (U.S. Patent No. 5,652,054).

Fullerton et al. is relied upon as described above.

Regarding claim 9, Fullerton et al. fail to disclose the particle size of the ferromagnetic grains/portions.

However, Kikitsu et al. teach that when forming a granular magnetic recording medium comprising ferromagnetic grains segregated by a non-ferromagnetic matrix, the grain size is preferably controlled to within applicants' claimed size range inorder to insure good signal-to-noise and recording characteristics (*col. 16, line 28 bridging col. 17, line 20*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Fullerton et al. to use grain/portion sizes meeting applicants' claimed size limitations as taught by Kikitsu et al., since such a structure can insure good signal-to-noise and recording characteristics.

Regarding claim 22, Kikitsu et al. disclose that it is acceptable to add ferromagnetic elements (*e.g. Pt*) to both the matrix and the grain provided that the relative concentration is controlled to insure good magnetic performance (*col. 4, lines 53 – 64; col. 5, line 58 bridging col. 6, line 6; and col. 11, line 51 bridging col. 12, line 6*). The Examiner deems that one of ordinary skill in the art would readily appreciate that the processing of such a recording layer would be easier if the tolerance of whether the matrix could comprise Pt when the ferromagnetic grains comprise Pt is relaxed (i.e. it is easier to process a recording layer where Pt is allowed to diffuse slightly from the grain to the matrix during deposition versus rigorously insuring that no Pt diffuses from the CoPt grains to the Co-containing matrix). Kikitsu et al. provides the explicit motivation

that it is acceptable to allow the tolerance to be relaxed, provided the amount of Pt in the matrix is minimal.

9. Claims 3, 5 – 9 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fullerton et al. as applied above in Paragraph 10, and further in view of Kikitsu et al. ('054) and Takizawa et al. (U.S. Patent App. No. 2002/0095767 A1).

Fullerton et al. is relied upon as described above in Paragraph 10.

Regarding claim 3, Fullerton et al. fail to disclose a matrix comprising both Cr and CoO.

However, Kikitsu et al. teach that elements added to the ferromagnetic grains (i.e. Cr) can be added to the non-ferromagnetic matrix (i.e. CoO), provided the amount is controlled (*col. 4, lines 53 – 64; col. 5, line 58 bridging col. 6, line 6; and col. 11, line 51 bridging col. 12, line 6*) and Takizawa et al. teach that segregants comprising oxides of Co, Cr and mixture thereof are known equivalents in the field of segregants for granular type magnetic recording media (*Paragraph 0060*).

Substitution of equivalents requires no express motivation as long as the prior art recognizes the equivalency. In the instant case, a segregant matrix of CoO and a segregant matrix of CoCrO are equivalents in the field of non-ferromagnetic segregant materials useable as the matrix in a granular magnetic recording layer per the teachings of Takizawa et al. and Kikitsu et al. above. *In re Fount* 213 USPQ 532 (CCPA 1982); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *Graver Tank & Mfg. Co. Inc. v. Linde Air Products Co.* 85 USPQ 328 (USSC 1950).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant(s) invention to modify the device of Fullerton et al. to use an oxide or nitride of both Co and Cr as taught by Takizawa et al. and Kikitsu et al., since such a segregant material is a known functional equivalent to CoO and adding elements from the magnetic grains to the non-ferromagnetic oxide is known to be acceptable provided the amount added is properly controlled.

Regarding claim 5, Kikitsu et al. teach that one can use ferromagnetic underlayers (*Fullerton et al., Figure 2, element 13*) instead of non-ferromagnetic underlayers inorder to optimize the recording medium depending on the desired type of recording/reproducing apparatus (*Kikitsu et al., col. 6, lines 25 – 64*). In this embodiment, the Examiner notes that the "host layer" (*Fullerton et al., Figure 2, element 15*) meets the structural limitations of the "first magnetic layer" and Fullerton et al. explicitly discloses Ms and Hc values meeting applicants' claimed limitations for the host layer, which is also a granular magnetic layer meeting the structural limitations of claim 1 (*col. 2, line 45 bridging col. 3, line 58; col. 5, lines 30 – 63; col. 6, lines 18 – 38; and Figure 5*).

Regarding claim 6, Fullerton et al. disclose embodiments meeting the claimed relative Ms values (*col. 5, lines 38 – 52 and claim 1*).

Regarding claims 7 and 8, Fullerton et al. disclose the claimed limitations (*col. 6, lines 18 – 38*).

Regarding claim 9, Kikitsu et al. teach that when forming a granular magnetic recording medium comprising ferromagnetic grains segregated by a non-ferromagnetic

matrix, the grain size is preferably controlled to within applicants' claimed size range inorder to insure good signal-to-noise and recording characteristics (*col. 16, line 28 bridging col. 17, line 20*).

Regarding claim 22, Kikitsu et al. disclose that it is acceptable to add ferromagnetic elements (*e.g. Pt*) to both the matrix and the grain provided that the relative concentration is controlled to insure good magnetic performance (*col. 4, lines 53 – 64; col. 5, line 58 bridging col. 6, line 6; and col. 11, line 51 bridging col. 12, line 6*). The Examiner deems that one of ordinary skill in the art would readily appreciate that the processing of such a recording layer would be easier if the tolerance of whether the matrix could comprise Pt when the ferromagnetic grains comprise Pt is relaxed (i.e. it is easier to process a recording layer where Pt is allowed to diffuse slightly from the grain to the matrix during deposition versus rigorously insuring that no Pt diffuses from the CoPt grains to the Co-containing matrix). Kikitsu et al. provides the explicit motivation that it is acceptable to allow the tolerance to be relaxed, provided the amount of Pt in the matrix is minimal.

Allowable Subject Matter

10. The following is a statement of reasons for the indication of allowable subject matter: claim 4 is deemed novel over the prior art (*though see the Examiner's Comments, above*) since the prior art of record fails to teach or render obvious a structure wherein the ferromagnetic portion comprises $0 < Cr\ (at\%) < 5$ while the matrix comprises Cr (at%) of at least 15 at%. The Examiner notes that Kikitsu et al. ('054)

teach Cr as a *ferromagnetic grain* additive and that the amount of the grain additive should be higher in the *grain* than in the matrix. Even given the knowledge in the art that Cr serves to segregate at grain boundaries, Kikitsu et al. fails to render obvious the relative atomic percentages. Shimizu et al. (U.S. Patent No. 6,699,600 B2) disclose controlling the relative amounts of Cr in both the grain boundaries and the ferromagnetic grains, yet teaches away from using < 5 atomic percent in the ferromagnetic grain (*i.e. Shimizu et al. requires 8 – 15 at% within the ferromagnetic grains*) (*see entire disclosure*). Moriwaki et al. (U.S. Patent App. No. 2004/0202843 A1) disclose a granular magnetic layer comprising CoCr grains in a Cr oxide, nitride or carbide matrix, but fails to disclose or render obvious using Co in the matrix and/or the relative amounts of Cr in the matrix and the ferromagnetic grains (*Paragraphs 0036 – 0037*). Kirino et al. (U.S. Patent No. 6,472,047 B1) disclose magnetic Co oxide grains surrounded by chromium oxide non-ferromagnetic material, but fails to disclose or render obvious using a non-ferromagnetic matrix comprising cobalt or the relative Cr concentrations in the ferromagnetic portion versus the matrix.

Response to Arguments

11. The rejection of claims 1 – 9, 21 and 22 under 35 U.S.C § 102(a), (b) and/or (e) and/or 103(a) – Kikitsu et al., alone or in view of various references

The above noted rejection has been withdrawn because applicant(s) amendment(s) have set forth new limitations (e.g. "said ferromagnetic portion comprises

more than zero and less than 5 atomic percent Cr") and Kikitsu et al. no longer qualifies as the closest prior art.

12. The rejection of claims 1 – 9, 21 and 22 under 35 U.S.C § 102(a) and/or (e) and/or 103(a) – Fullerton et al., alone or in view of various references

Applicant(s) arguments have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Arisaka et al. (U.S. Patent No. 6,773,745 B2) disclose a granular magnetic layer comprising CoCr ferromagnetic portions surrounded by Co-oxide nonferromagnetic particles, however Arisaka et al. fail to explicitly disclose Cr concentrations in the ferromagnetic portions or the matrix (*see entire disclosure*). Yusu et al. (U.S. Patent No. 6,174,597 B1) disclose a granular magnetic recording medium similar to Kikitsu et al. ('054). Chen et al. (U.S. Patent No. 5,658,659) disclose a granular magnetic layer comprising CoCr alloys surrounded by a matrix which can comprise an oxide or nitride of Co and/or Cr, but fail to disclose relative Cr concentrations between the ferromagnetic grains and the non-ferromagnetic matrix (*col. 10, line 34 bridging col. 11, line 19*)

14. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Kevin M. Bernatz whose telephone number is (571) 272-1505. The Examiner can normally be reached on M-F, 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Carol Chaney can be reached on (571) 272-1284. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KMB
January 30, 2007

Kevin M. Bernatz, PhD
Primary Examiner